UNIVERSITY OF MALAYA

UMR

UMR BULLETIN

VOLUME 18, NO. 2, 2018

CHILDHOOD LEUKAEMIA: IMPROVEMENT IN SURVIVAL RATE

"Childhood Acute Lymphoblastic Leukaemia (ALL) is the most common form of cancer in children. UM researchers raised cure rates for high-risk childhood leukaemia patients from 69.6% to 91.6% while lowering relapses from 30% to 13%."

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A BRAND NEW JOURNAL

JOURNAL OF RESEARCH MANAGEMENT & GOVERNANCE

AIMS AND SCOPE

Journal of Research Management & Governance (JRMG) is a peer-reviewed, open access journal published biannually by the University of Malaya, Malaysia.

JRMG aims to provide a platform for sharing and dissemination of knowledge in the area of research management. Articles published in JRMG cover all aspects related to management and governance of research in universities, research organizations, funding agencies and governments.

SPECIFIC TOPICS INCLUDE (BUT NOT LIMITED TO)

- research ecosystem
- impact of research
- strategies and policies
- research policy and ethics
- changing research environment
- full economic costing and research funding
- knowledge transfer from research to application
- study and practice of research management profession
- developments within higher education environment
- quality and innovation in research administration and management
- data science and data curation as applied to research management
- human resource management and development, organizational behaviour etc.
- implications of major external influences on research management (e.g. funding, research collaborations, politics, world economy, mega trends etc.)

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PREFACE

The year 2018 has been quite a challenging year for our researchers. Slow economic growth and tightening of monetary policy have resulted in budget cuts and reduced in research funding, particularly from government agencies which has been the major funding body for many of our researchers. However, behind every cloud, there is a silver lining. With the assistance of research managers at IPPP, several of our researchers have been able to secure international grants which led to some increase the amount of international research funds UM received this year.

This year we have also began to restructure our existing clusters, consolidating it from 6 research clusters to 4 research clusters. These research clusters are Health and Well-being Research Cluster, Social Innovation and Happiness Research Cluster, Innovative Industry and Sustainability Science and last, but not least Frontiers of the Natural World. These clusters should be the platform for multi- and transdisciplinary research of the universities and be the champion for the niche as well as thrust or emerging research strength at UM. The tagline for research, i.e., “UM research transforming knowledge, industries and societies” was chosen to remind researchers that whatever research that is carried out must not produce only output, mainly in terms of publications and human capital but also provide outcome and impact, either in new or novel knowledge that can be expanded or produce some disruptive technology for the industries or some benefit to the community and society in Malaysia, in particular, if not globally.

For now, the outlook for 2019 remains the same, in terms of available research funds from the government resources. This means that we have to work equally as hard to look for research grants from external sources such as industries, both local and international as well as from international research funding agencies. We, at the R&D offices, will continue to assist our research in their quest to “transform knowledge, industries and societies” through their research output as much as we can. Meanwhile, I would like to take this opportunity to thank everyone for all efforts put in 2018 and wish everyone a successful 2019.

Thank you.

Prof. Dr. Noorsaadah Abd Rahman
Deputy Vice-Chancellor (Research & Innovation)

We are happy to present the second issue of UMR Bulletin for 2018. It showcases, as with our other issues, a wide range of exciting research happening in UM, from the ground breaking work of Prof Hany Ariffin on childhood leukemia, to mosque tourism in Malaysia by Prof Ainin and team. "Adi-Wira" - the human machinery is a great example product of trans-disciplinary research between the Faculties of Engineering and Medicine. Coverage on a study of the Bario people by Dr Welyne from Arts and Social Sciences, has an interesting rare illustration of how Bario salt is produced. The UM Research Carnival (UMRC) 2018 with the theme "Research Partnerships for Societal Impact" was held on 15 and 16 November at Dewan Tunku Canselor. It was a very successful event with over 1200 visitors including UM alumni and external stakeholders participating in various activities of the two-day programme. On 17 Nov 2018, in conjunction with UMRC 2018, a Carnival Run was held for the first time and the response was truly overwhelming! The Vice-Chancellor himself graced both events, officiating the UMRC and flagging off the runners for the Carnival Run. We thank everyone who had made UMRC 2018 and the first UM Carnival Run a great success ! In this issue we have a centre spread of infographics on our evolution towards research excellence, taken from a giant poster that was put up for UMRC 2018. We strive to sustain the momentum of excellent research in UM through strategic planning and providing as much support in optimizing existing resources, to continue producing the expected outputs and making impact to the real world. Here's wishing you a pleasant closure to 2018 and a prosperous year ahead for 2019.

Prof. Dr. Shaliza Ibrahim
Associate Vice-Chancellor (Research & Innovation)

EDITORIAL MESSAGE

Dear readers,

It is our pleasure to present to you the latest publication of UMR Bulletin (Volume 18, No. 2). Our goals are to create a platform for information exchange on all aspects related to research, covering the science and non-science research projects, as well as to encourage the dissemination of these knowledge to a broader audience. To achieve these, we strive to keep you updated on the current and continuous breakthroughs made by UM researchers, by giving you inside stories on their development and directions, plus introducing and highlighting our researchers and experts in each article.

Thus, we welcome you to submit original research write-ups with related images/photos of studies run by UM researchers. We hope that UMR Bulletin develops into a respected publication that is able to link external partners with our experts for any kinds of service or collaboration, that will ultimately enable us to transform our research into public consumption.

Our success entirely depends on your response. Thank you for providing us your continuous feedback and support.

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CHILDHOOD ACUTE LYMPHOBLASTIC LEUKAEMIA

PROF. DR. HANY MOHD ARIFFIN
FACULTY OF MEDICINE

Childhood Acute Lymphoblastic Leukaemia (ALL) is the most common form of cancer in children. A Malaysia-Singapore collaborative team, consists of Prof. Dr. Hany Ariffin (University of Malaya), Assoc. Prof. Dr. Allen Yeoh (National University of Singapore) and Assoc. Prof. Dr. Tan Ah Moy (KK Women's and Children's Hospital), has managed to raise cure rates for a special, poor-risk group of ALL patients from 69.6 percent to 91.6 percent while also lowering relapses in this group from 30 percent to 13 percent.

The three doctors studied the peculiarities of these children's leukaemia cells and developed a new treatment protocol that turned out to be extremely successful.

Certain types of leukemia cells have special features in their genes which render them resistant to conventional treatment. In this high-risk group, their leukaemia cells were found to be without the Ikaros *IKZF1* gene (a development referred to as Ikaros deletion) and previously had lower cure rates. With the new protocol, this group was actively sought and given intensified chemotherapy treatment, leading to increased survival of 91 percent.

The Malaysia-Singapore (Ma-Spore) ALL 2010 study is a collaboration of four hospitals in Malaysia and Singapore – the University of Malaya Medical Centre (MY), Sime Darby Medical Centre (SDMC) in Subang Jaya (MY), National University Hospital (NUH) (SG) and KK Hospital (SG).

Prof. Dr. Hany Ariffin with her Singaporean collaborators, Assoc. Prof. Dr. Allen Yeoh (seated) and Dr. Tan Ah Moy with a patient and his mother. Copyright : National University of Singapore

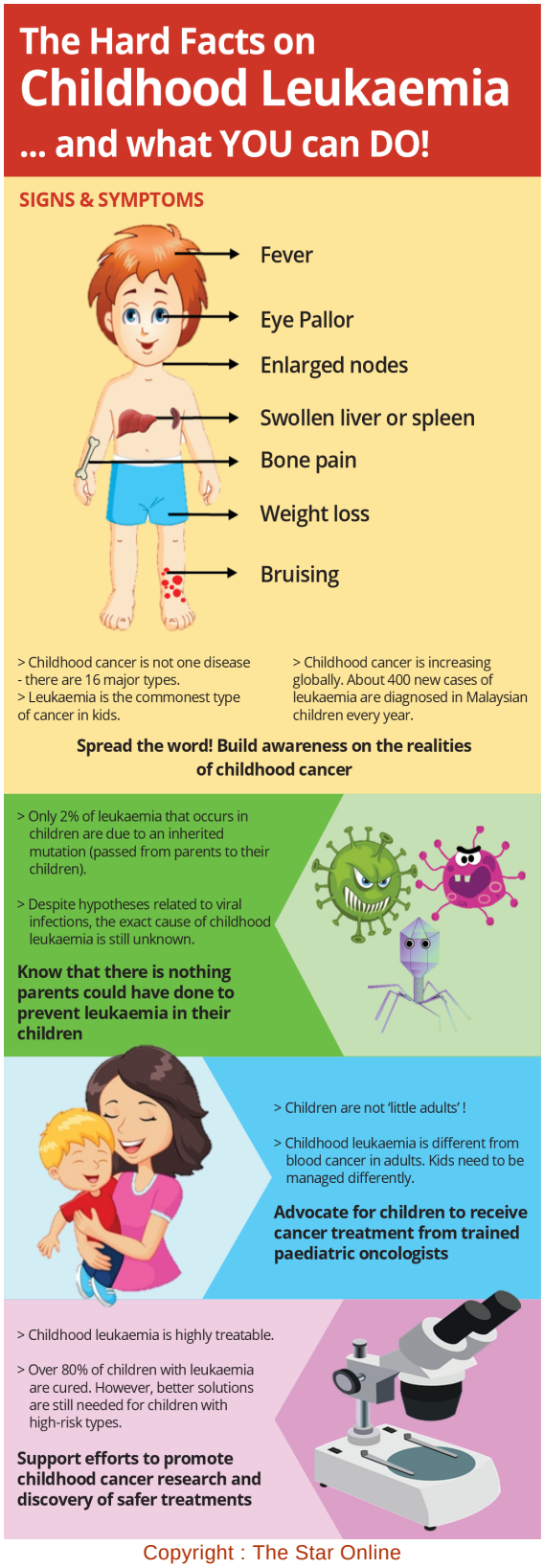
In an earlier 2003 study, the team were able to achieve excellent overall cure rates of 80.6 percent by applying risk-stratified chemotherapy. However, better solutions were still needed for children with high-risk disease. This led to the findings of the current study.

The team is now designing a new study, Ma-Spore ALL 2020, which will explore novel approaches to improve outcome of children with ALL who are in the worst-risk category, a particularly challenging group.

Prof. Hany Ariffin is proud of the many achievements of the Ma-Spore group. “In addition to the impressive gains in survival rates, the collaboration has also facilitated transfer of knowledge and technology to the team in University of Malaya. This has allowed many Malaysian children to receive sophisticated and personalised leukaemia therapy, irrespective of their socio-economic standing.”

Prime Minister Tun Dr. Mahathir Mohamad was impressed with the UM-NUS cooperation and praised the childhood leukemia project during his honorary doctorate conferment by NUS on 13 November 2018. At the same event, NUS President Prof. Tan Eng Chye described the Ma-Spore ALL collaboration as “a shining example of the two universities’ combined impact in making life-changing discoveries".

The Ma-Spore Leukemia Study Group receives funding from the Singapore Ministry of Health’s National Medical Research Council Clinician Scientist Investigator Awards, Cancer Science Institute of Singapore, Children’s Cancer Foundation and Viva Foundation for Children with Cancer. Meanwhile, the Malaysian team is supported by research grants from University of Malaya as well as charities.



"WALKING FOOTBALL" - A UNIQUE SPORT FOR SCHOOL CHILDREN

DR. HAIREEN ABDUL HADI
FACULTY OF MEDICINE

Obesity rate is on the rise globally. According to the latest statistics from the National Health Morbidity Survey (NHMS 2015), 38 percent of Malaysian children are overweight and more than seven percent under the age of five have been identified as overweight. In the meantime, the obesity rate for population in Malaysia below 18 years old is around 11.9 percent. It seems like Malaysia is not only growing rapidly towards a developed nation, but it also grows into into a nation with the most obese adults in Southeast Asia. This prevalent trend of childhood obesity in country is due to many risk factors, such as poor food choices and portion, increasing TV watching time and fewer physical activities.

Making lifestyle changes is an important factor in managing and preventing childhood obesity. Many researchers from abroad have come out with various methods to increase children's participation in physical or sports activities. However, access to structured fitness programmes for obese children is still limited. As the problem is yet to be solved, a team of researchers from University of Malaya has found an interesting way to prevent and reduce the occurrence of obesity in children. In 2017, Dr. Haireen Abdul Hadi from Faculty of Medicine discovered and

local football club in the UK. The game was played to help their members over the age of 50 to perform physical activity. Walking football is an interesting sport that has been proven to have a good impact on health. Players benefit from the increasing step counts and consequently improve their fitness level and body composition, thus preventing obesity-related complications in the long run.

Recent studies show that 30 percent of school children in Malaysia were found to be either overweight or obese. These children are usually marginalized when it comes to sporting activities and this might trigger other issues such as low self-esteem. Therefore, the project aims to introduce walking football school to children and teachers as an intervention to combat their weight issues early in their primary school years.

During the pilot study, data was obtained on the anthropometrical and fitness level changes exhibited following a 12-week walking football programme by primary school children aged eight to 12 with BMI more than 21 (95th centile). Those who took part in this project had their fitness level, body weight, height and body measurements taken before and after they embarked on the project for three months. Their fitness levels were measured with a 6-minute walking test. Healthy male school children from eight schools from Petaling Jaya (PJ) were recruited for this program. Each school forms two teams, with six students per team, and trained together. The training sessions comprised of multiple short 6-a-side semi-structured games (25 min/session) with a cumulative of 150-minute session each week. At the end of week 12, the children participated in an inter-school walking football competition.

As a result, the programme demonstrated positive impact on anthropometrical and fitness changes among the participating children. Findings show that walking football is an excellent alternative weight management for obese school children.

This article has been published in Asia Research News (http://www.researchsea.com/html/article.php/aid/12050/cid/3/research/medicine/university_of_malaya/walking_football_for_active_lifestyle_among_children.html)

The cost-effectiveness of this activity suggests its feasibility to be implemented regionally or nationwide in order to combat the rising problems of inactivity and childhood obesity. Furthermore, this low-impact sports activity has positive social and motivational factors that may facilitate compliance that help to maintain an active lifestyle among the children.

From a mere pilot project in 2017, the “Walking Football” initiative has expanded. In November 2018, 20 schools in PJ and Penang took part in the tournament, organised as part of collaborative partnership between University of Malaya and Universiti Sains Malaysia through the Regional Centres of Expertise (RCE) community network. Additionally, The "Walking football: Fat to fit for better personal health" has received an RCE Award 2018 under the category Acknowledged Flagship Project for its contribution to SDG 3: Good Health and Well Being. The award was presented at the 11th Global RCE Conference held in Cebu, the Philippines from 7 to 9 December 2018.

Co-Researchers

Dr. Zulkarnain Jaafar

Dr. Amani Natasha Ahmad Tajuddin

Dr. Julia Suhaimi

CANCER PREVENTION – THE WAY FORWARD TO TACKLE RISING CANCER BURDEN

ASSOC. PROF. DR. LOH SIEW YIM
FACULTY OF MEDICINE

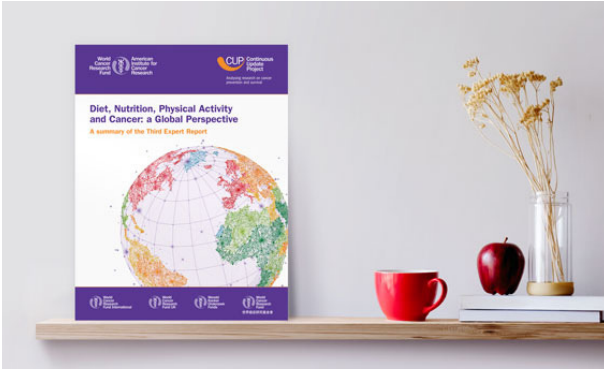
Cancer is not a single disease but a group of related diseases where many things in our genes, our lifestyle, and the environment around us may increase or decrease our risk of getting cancer. Researchers are studying ways to prevent cancer. In fact, research shows that up to 50 percent of cancer cases and deaths are preventable. Prevention and early detection are crucial and proven to be effective strategies to lower healthcare utilization costs. With increasing healthcare cost, cancer prevention is the most cost-effective and sustainable long-term strategy to control cancer. Common risk factors for cancer include aging, tobacco, radiation exposure, chemicals and other substance exposures, some viruses, certain hormones, family history of cancer, alcohol, poor diet, lack of physical activity and overweight. This low-cost self-management strategies are particularly important for low-to-middle income countries as they now share a major burden of the costs for cancer globally.

National Cancer Institute (NCI) recommended ways to avoid or control things known to cause cancer: changes in diet and lifestyle, finding precancerous conditions (conditions that may become cancer) earlier, chemo-prevention or medicines to treat a precancerous condition or to keep cancer from starting, and risk-reducing surgery to prevent cancer. These are some of the evidence-based cancer prevention strategies from NCI, which also runs the cancer prevention fellowship for post-docs.

Research suggests that only five percent of cancers are hereditary. This means the non-inherited causes of cancer are available to us in terms of our lifestyle choices, food and physical activity. All of these have a direct impact on our overall cancer risk. Some cancers that are preventable including breast, colorectal, prostate, oral, skin, testicular, liver and lung.

Assoc. Prof. Dr. Loh runs the KeepAble cancer community at Jln. 16/4 Petaling Jaya. Interested staff and students can volunteer to support/ led healthy lifestyle activities. The centre is calling out like-minded researchers and potential postgraduate students keen to study on cancer survivorship/ prevention.

FB: keepable cancer community



CANCER PREVENTION TIPS

The following are some simple recommendations and tips on cancer prevention:

(1) Smoking is the number one risk factor linked to the cancer of the lung, mouth, throat, larynx, bladder, pancreas, cervix and kidney. Chewing tobacco is also associated to oral cancer and pancreas cancer. Exposure to second-hand smoke increases the risk of lung cancer.

(2) Alcohol increases risk of breast, colon, lung, kidney and liver cancers. The amount and period of time of regular drinking are highly associated to the risk of these cancers.

(3) Physical activity is an independent risk and it lowers the risk of 13 cancers including breast and colon. About 150-minute a week of moderate aerobic activity or 75-minute a week of vigorous aerobic physical activity, should be the target (at least 30 minute of physical activity in daily routine). It also helps weight control.

(4) Healthy diet helps to reduce the risk of cancer when a lighter and leaner eating behaviour is practiced with less processed food or red meats, high-calorie food like refined sugars and animal fats are consumed, and more fruits and vegetables including whole grains and beans are consumed. Mediterranean diet is a healthy diet because it is mostly plant-based food, such as fruits, vegetables, whole grains, legumes and nuts.

(5) Maintaining a healthy weight can lower the risk of cancer of the breast, prostate, colon, kidney and lung. Maintain a healthy BMI index of 25.

(6) Practice self-examination regularly and screen for cancers, especially cancer of the skin, colon, cervix and breast. If cancer is detected early, the treatment is most likely to be successful. Take cancer prevention into your own hands starting today. The reward will last a lifetime.

(7) Avoid risky behaviours. One low cost-effective cancer prevention tip is to avoid risky behaviour that can lead to infections which subsequently increase the risk of cancer. Two common recommendations are to practice safe sex by limiting the number

of sexual partners and using condoms when having sex and to avoid sharing of needles. People with HIV or AIDS have a higher risk of cancer of the anus, liver and lung. HPV is most often associated with cervical cancer, but it might increase the risk of cancer of the anus, penis, throat, vulva and vagina as well. Sharing of needles with an infected drug user can lead to HIV as well as hepatitis B and C, which can increase the risk of liver cancer.

(8) Get immunized. Some viral infections can increase risk of cancer. For example, hepatitis B can increase the risk of liver cancer whereas human papillomavirus (HPV), a sexually transmitted virus, can lead to cervical and other genital cancers as well as squamous cell cancers of the head and neck. Thus, hepatitis B vaccine is recommended for certain high-risk adults (i.e. adults who are sexually active, people with sexually transmitted infections, intravenous drug users, men who have sex with men, and health care workers or public safety workers who are exposed to infected blood or body fluids) while HPV vaccine is recommended for girls and boys ages 11 and 12. It is also available to both men and women ages 26 or younger who have not received the vaccine as adolescents. A study of young adults (n> 2600) found that the prevalence of oral infection with four HPV types, including two cancer-causing types, 88% lower in those who had reportedly received at least one dose of HPV vaccine than those who had not been vaccinated.

The Prevent Cancer Foundation in USA is an organization set up with a mission to save lives across all populations through cancer prevention and early detection. Its aim is to stop cancer before it starts, and they achieve this through their four pillars of research, education, outreach and advocacy. It has commissioned a series of Public Service Announcements, designed to entertain while raising awareness about preventable cancers, such as breast, cervical, colorectal, lung, oral, prostate, skin and testicular that can be prevented through lifestyle changes or early detection and treatment.

In conclusion, the leading preventable risk factors such as obesity, lack of physical activity, tobacco and alcohol use, and getting vaccinations are worth investing and researching to prevent cancer risks. It is the way forward towards a sustainable healthcare cost for the rising burden of cancer. More research into cancer prevention will pave the way to reduce the burden of cancer.

This article has been published in Asia Research News (https://www.researchsea.com/html/article.php/aid/12241/cid/3/research/medicine/university_of_malaya/cancer_prevention_research_and_practice_____the_way_forward_to_tackle_rising_cancer_burden.html)

BARRIERS TO WOMEN MOBILITY

DR. YONG ADILAH BINTI SHAMSUL HARUMAIN
FACULTY OF BUILT ENVIRONMENT

There is a saying that “The hand that rocks the cradle is the hand that rocks the world”. Women hold important roles in the society and at the same time are responsible for the well-being of their family. Regardless if a woman is working or otherwise, her mobility is critical. This issue prompted a research team, led by Dr. Yong Adilah Binti Shamsul Harumain, to study and understand on how women travel and identify problems that shackled them while travelling daily. She was joined by co-researchers Dr. Nikmatul Adha Binti Nordin, Dr. Goh Hong Ching and Dr. Suzaini Binti Zaid from the Faculty of Built Environment, University of Malaya (UM). This one-year study is funded by the United Kingdom's Arts and Humanities Research Council (AHRC).

Bus stop is one of the frequently used infrastructure facilities by women on the move

Compiling information and experience on physical mobility using public transportation

Dr Yong's team, along with collaborators from Coventry University (United Kingdom) and researchers from DesignPAK (Pakistan), aim to study the current mobility scenarios from the women’s perspectives in these three countries. According to a preliminary study, researchers found that some of the most common cases related to women using public transportation is sexual harassment. Other cases related to women travelling and driving solo are harassment, assault and road bullies. Women's mobility is all about women's daily movement, either on foot, private vehicles or public transportation. It covers the influence of physical designs and infrastructure facilities, such as pedestrian paths, street lights and travel distance that affect the safety and movement of a woman daily.

In 2017, Prasarana Malaysia Berhad reported 22 sexual harassment cases at the Light Railway Transits (LRT). Cases related to this kind of harassment can cause physical disturbances to women and leave emotional trauma to the victims. The government has taken various steps to reduce these cases but observation has shown that in average, our public transportation system finds it difficult to guarantee the safety of women. In the current economic situation, however, women need to be mobile to accomplish their daily tasks whether to support themselves or to help their families. In Malaysia, various steps have been taken to address the safety of women on the move, such as the implementation of Ladies Coach by the Malayan Railways Limited (KTM), ladies-only parking bays in many shopping malls and other specialised facilities.

In order to respond to the research objective, a Focus Group Discussion (FGD) was hosted on 3 October 2018. Led by Dr. Yong Adilah, it emphasized on the issues and problems related to mobility encountered by women of all ages in Malaysia. The aim was to gather information on women safety program from many agencies as well as to understand problems related to women mobility from NGOs' perspectives and students from different schools in Kuala Lumpur.

Couch provided by KTMB for woman passengers

Participants in this study comprised of 25 respondents from various ages, economic and social status. Some of them were from government agencies, such as Kuala Lumpur City Hall (DBKL), Federal Department of Town and Country Planning Peninsular Malaysia (JPBD) and Royal Malaysia Police (PDRM), while others were from NGOs such as Think City, National Council of Women Organization (NCWO) and All Women Action Society (AWAM). It was also attended by female students from International Islamic University Malaysia (UIAM) and secondary school students of SMK (P) Bukit Bandaraya, SMK Sri Aman and SMK Taman Desa.


Focus Group Discussion (FDG) between researchers and participants from different agencies.

The session provided an opportunity for the participants to speak up about the problems they encountered on women's mobility in Malaysia, especially on public transportation. At the end of the discussion, it is agreed that emphasis should be given especially to those who are at high risk for street crime like women, to ensure the well-being of the people.

Overall, findings from this discussion could be the starting point for the relevant authorities and policy makers in realising the safety of women's mobility in Malaysia thus leading to a positive change, especially in our transport system.

Focus Group Discussion (FDG) between researchers and participants

THE SCREENMEN PROJECT

PROF. DR. NG CHIRK JENN
FACULTY OF MEDICINE

For decades, men live shorter and have higher morbidity and mortality compared to women. Health screening is one of the important strategies to improve men's health, however, there is a dearth of research exploring the barriers and facilitators of engaging men in health screening globally. Male's perspectives and attitudes towards preventive health services should be taken into account when planning strategies to increase screening uptake in men.

Increasingly, men, particularly those aged 25 to 44 years, have easy access to and are familiar with Information and Communications Technology (ICT). Therefore, ICT is potentially a powerful medium to reach out to men and improve their health by imparting health knowledge, increasing health awareness, changing men's health attitudes and behaviours. Thus, using the United Kingdom Medical Research Council Complex Intervention Framework, this project aims to develop and evaluate a mobile web app to educate men about their health risks, motivate them to stay healthy and empower them to undergo evidence-based health screening.

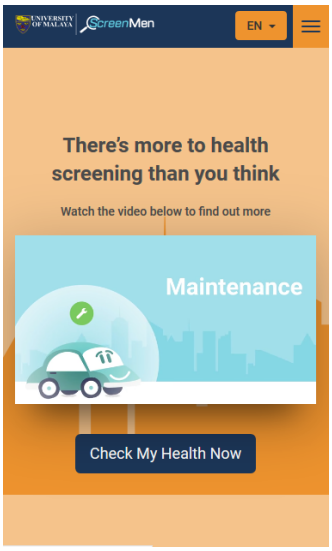
ScreenMen was developed based on theories, evidence and needs of men. The ScreenMen web contains bite-size educational videos that address misconceptions about health screening. The researchers interviewed 31 men in the community to find out the challenges men face when undergoing health screening and to ask them for suggestions on an ideal screening web app. The content of ScreenMen was based on local and international clinical practice guidelines on screening.

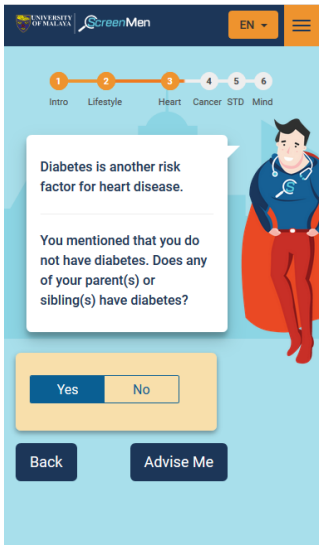
The development of ScreenMen followed a user-centered and iterative approach, where the prototypes were tested for its utility and usability with experts from various backgrounds and men from the community. It can also assess users' health, provide advice about their health status and what screening tests to go for. It includes a list of frequently asked questions to address men's concerns about undergoing health screening. Another unique feature of

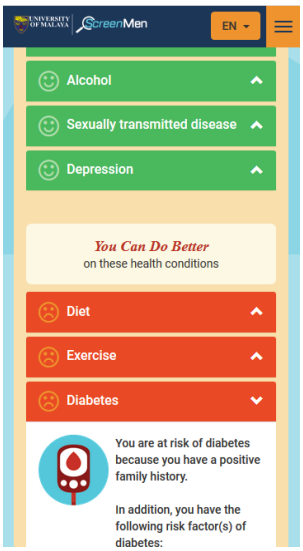
ScreenMen is that it empowers men to avoid unnecessary health screening such as cancer biomarkers and imaging to help combat low-value health service, which is widely practiced in the community. The web also has a function to help users set up and remind them about their next screening date.

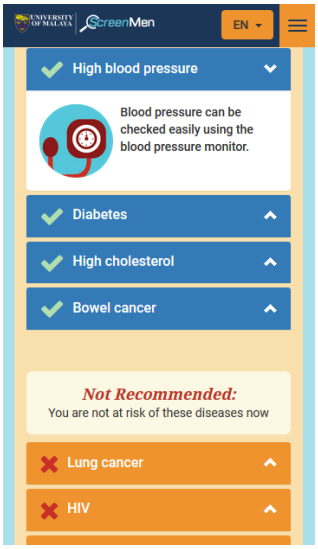
ScreenMen is probably the first mobile web app in the world to provide comprehensive and evidence-based health screening for men. It covers comprehensive range of evidence-based screenings including lifestyle risk factors, cardiovascular disease, cancers, infectious diseases and mental health. ScreenMen uses a self-driven algorithm to assesses users' health and provides personalised advice to them based on their own health risks, which mimicks an actual consultation with a doctor.

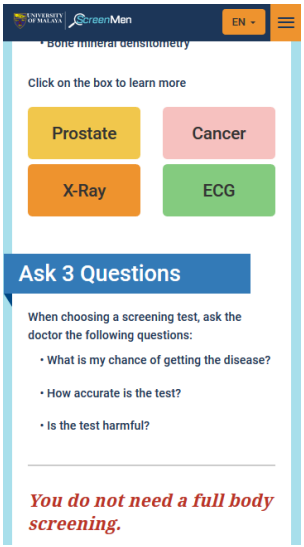
Currently, ScreenMen is being evaluated in a randomised controlled trial to determine its effectiveness in improving health screening uptake in men. The team hopes to work with Ministry of Health to implement ScreenMen in the public health clinics to reach out to men who attend the clinics once the evaluation is completed. In addition, the team also intend to disseminate ScreenMen to men through social media, doctors' recommendation and integrating it into workplace.

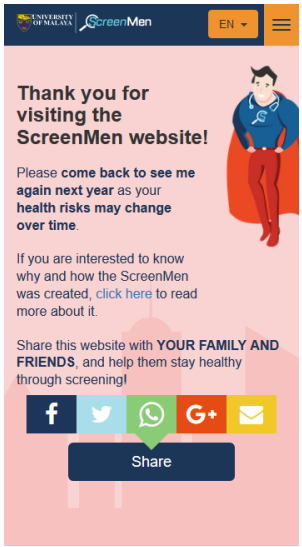












THE SALES AND SERVICE TAX (SST)

DR. PUI KIEW LING
FACULTY OF ECONOMICS AND ADMINISTRATION

Tax revenue serves as one of the main sources for public finance. Malaysia has undergone two main stages of change in consumption-based taxation since 2010: (1) replacing the sales and service tax (SST) with a goods and services tax (GST) on 1 April 2015, and (2) reducing GST to 0 percent from 1 June to 31 August 2018. The reinstatement of SST, on the other hand, took place on September 2018.

In comparison to SST, GST is considered to be more transparent and can reduce tax fraud among companies. The latter can generate more revenue to finance public goods, such as free education and health services, which subsequently increase human capital and investment infrastructure in the long term.

Generally, GST is assessed in accumulation, based on an increase in value of a good or service at each stage of production or distribution. Because of tax exemption and credit refunding, GST acts as a kind of destination-based tax, i.e. the tax is finally applied to the sales price the consumers pay.

Purportedly, GST will not induce inflation as producers have no excuse to. The prices of goods and services remain virtually the same as before its implementation. The only difference is that consumers pay six percent more for the same basket of goods and services.

While in theory it all seems perfect, the implementation is perceived to be otherwise. Revenue redistribution lacks transparency and general prices continuously rise, leading to its unpopularity.

Some businessmen who were involved in profiteering took advantage of the GST system. The lack of enforcement on price control in different locations also contributed to the issue. Also, some complaints from the public elucidate that the tax-refunding system was inefficient and often came with some delay. The need to cover higher production costs created another excuse to increase the prices on goods and services. These factors have caused the public to believe that GST was purely a burden and did not benefit them economically, thus led

to public distrust and social protests that ultimately called for its zerorization.

On the other hand, the reinstatement of SST has lesser coverage than GST. Consumers will not be burdened as much with the tax payment and the new taxation system is expected to simulate stronger purchasing power and gross domestic product (GDP) growth in 2019.

Given the narrower tax coverage of the SST, the question is whether the total government revenue can sustain its finances, besides dealing with national debt and budget deficits. According to Economic Report 2017/18, GST system alone contributed to about RM40 billion, nearly one-fifth of the total government revenue for the year 2016 and 2017 respectively.

As the population rate steadily increases in recent years, it is logical to predict that the SST revenue would hardly increase in the near future, at least in 2019. Technically, the SST could easily replace the GST system and contribute to the economy.

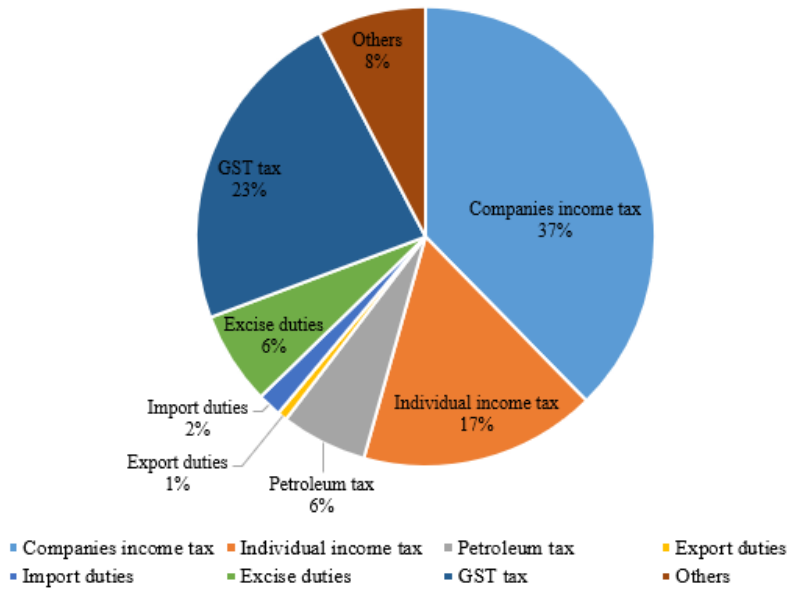
However, government might cut down on some expenditures in the future if this new SST cannot yield sufficient funds.

A fundamental taxation source is essential to take the country out of the middle-income trap and move toward sustainable development goals, which will be the common global economic trend for the next 10 to 20 years.

Economists speculated that GST is more efficient than SST because of its larger contribution to economic financing. With the current economic challenges, the GST policy works best to sustain public deficits and national debt, leading to long-term economic growth.

As the pressure to obtain additional revenue mounts, the introduction of more forms of taxation seems inevitable in the few years to come.

This article has been published in Asia Research News (https://www.researchsea.com/html/article.php/aid/12249/cid/4/research/business/university_of_malaya/malaysian_taxation_-_the_tasks_ahead_for_sst.html)



Federal Government revenue, 2017 (RM million)
Source: Economic Report 2017/18, Ministry of Finance Malaysia

EVOLUTION TOWARDS RESEARCH EXCELLENCE

2018

1. Rationalisation of IPPP
   a) Established Research Data Management Unit
   b) Established Research Management Policy & Strategy Unit
   c) Formalized Data Intensive Computing Centre
2. Rearrangement of grant management
   a) Pre-award
   b) Post-award
   c) Research impact
3. Restructuring of Research Clusters:
   a) Social Advancement & Happiness
   b) Health & Well-Being
   c) Frontiers of The Natural World
   d) Innovative Industry & Sustainability Science

2016

1. Created 2 Associate Vice-Chancellor positions under the Deputy Vice-Chancellor (R&I)
   a) Associate Vice-Chancellor (Research & Innovation)
   b) Associate Vice-Chancellor (Industry & Community Network)
2. Restructuring of IPPP
   a) Institute of Research Management & Commercialization

2014

Restructuring of Research Cluster
a) Equitable Science
b) Frontiers Science
c) Humanities
d) Innovative Technology
e) Sustainability Science
f) Wellness

2013

Restructuring of IPPP
a) PPGP
b) PPP
c) UMCIC
d) UPUM
e) Research Clusters
f) Laboratory Animal Centre

2011

1. Restructuring of Research Cluster
2. Restructuring of IPPP
   a) UPGP
   b) UPPP
   c) UPPM

2009

Restructuring of Research Cluster
a) Advanced Engineering & Technology
b) Advanced Fundamental Research
c) Biotechnology & Bioproduct
d) Health & Translational Science
e) Humanities & Ethics
f) ICT & Computational Science
g) Social Behavioral & Science
h) Sustainability Science

2008

Restructuring of IPPP
a) Institute of Research Management & Monitoring (IPPP)
b) UPGP
c) UPP
d) Promotion and Knowledge Management Unit
e) Research Monitoring Unit

2007

Establishment and Recognition as a Research University

2005

Appointment of Deputy Vice-Chancellor (Research & Innovation)

2000

Institut Pengurusan Penyelidikan & Perundingan (IPPP)
a) UPDiT (Formerly Unit R&D)
b) UPTK
c) UPUM
d) UPP
e) Radiation Protection Services Unit (UPPS)

1995

R&D Unit
a) Management of research grants (IRPA, MTCS, Skim PASCA, Tabung HRD, Fellowship Sains Negara)
b) Payment

Updated information as of 31 Dec 2018

UNIVERSITY OF MALAYA

FACTS & FIGURES

UMR University of Malaya Research

Deputy Vice Chancellor (Research & Innovation)

(2006 - 2008)	(2009 - 2010)	(2010 - 2012)	(2012 - 2015)	(2015 -)
Prof. Dato' Dr. Muhamad Rasat Muhamad	Prof. Dato' Dr. Mohd Jamil Bin Maah	Prof. Dr. Hamzah Bin Hj Abdul	Datuk Professor Dr. Awg Bulgiba Bin Awg Mahmud	Prof. Dr. Noorsaadah Binti Abd Rahman

Directors of Institute of Research Management & Services (IPPP)

(2001 - 2005)	(2006 - 2009)	(2009 - 2015)	(2015)
Prof. Dato' Dr. Muhamad Rasat Muhamad	Prof. Dr. Nik Meriam Binti Nik Sulaiman	Prof. Dr. Noorsaadah Binti Abd Rahman	Prof. Dr. Shaliza Binti Ibrahim

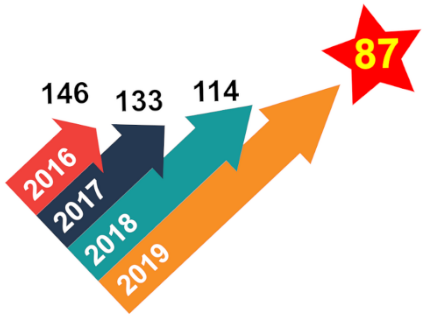
ACADEMIC RANKING OF WORLD UNIVERSITIES SINCE 2003

301 - 400

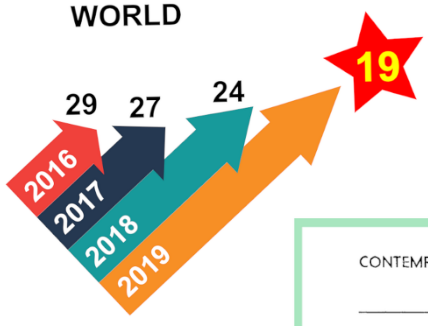
34

UI GreenMetric World University Rankings

QS TOPUNIVERSITIES



WORLD



ASIA

Associate DVC (Research & Innovation)

Associate DVC (Industry & Community Services)

(2015 -) Prof. Dr. Shaliza Binti Ibrahim

(2016 -) Prof. Dr. Rofina Yasmin Binti Othman

27,707 articles published (2008 - 2017)

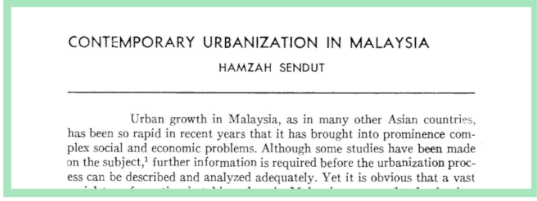
5,427 local postgraduate students graduated (2010 - 2017)

3,052 international postgraduate students graduated (2010 - 2017)

4,383 intellectual property rights have been produced including 191 patents granted (2007 - 2017)

Received 2,338 external grants & 8,400 internal grants (2010 - 2018)

Updated information as of 31 Dec 2018



CONTEMPORARY URBANIZATION IN MALAYSIA

HAMZAH SENDUT

Urban growth in Malaysia, as in many other Asian countries, has been so rapid in recent years that it has brought into prominence complex social and economic problems. Although some studies have been made on the subject,[1] further information is required before the urbanization process can be described and analyzed adequately. Yet it is obvious that a vast

One of the earliest publications

An article entitled "Contemporary Urbanisation in Malaysia" published in Asian Survey (1966) by the late Tan Sri Hamzah Sendut.
(Vol. 6, No. 9, pp. 484-491)

The First Patent Commercialized in 1987

A Pump For All People

Inventor:	Prof Dr. Goh Sing Yau
Patent No:	MY-100511-A
Novelty:	A simple but reliable handpump made of polyvinyl chloride (PVC) to obtain clean water supply in areas lack of piped water supply especially in rural areas.

PROMOTING HEALTHY AGEING IN BARIO: THE LAND OF A THOUSAND HANDSHAKE

DR. WELYNE JEFFREY JEHOM
FACULTY OF ARTS AND SOCIAL SCIENCES

Sunset at Bario Highlands

Bario, a community located on the Kelabit Highlands in Sarawak near the border of Sarawak-Kalimantan is the main settlement of the Kelabit tribe. In the Kelabit language, 'Bario' means the 'wind' and it is also known as 'The Land of a Thousand Handshake', depicting the hospitality of local people.

Bario is a land with colourful culture, sweeping agricultural landscape, and the natural scenery of verdant tropical rainforest. Production of the Bario salt, traditional cultivation of the famous Bario rice, plantation of pineapples and traditional Kelabit performance are the main attractions in Bario.

Sarawak Convention Bureau (SCB) has invited four researchers from University of Malaya (UM) to join its program – Redefining Global Tribes: Honouring Sarawak's Convention Ambassadors to "The Land of a Thousand Handshakes" Bario on 12 to 15 July 2017.

In this visit, the researchers had two dialogue sessions with the Kelabit elders, village heads and Councilor from Miri City Council at Bario Asal Lambaa Longhouse and community hall. From these sessions, Bario people raised concern on environmental, health & cultural issues which has opened research opportunities for a better Bario.

UM researchers found that education and empowerment are the key to sustainable living for people of Bario. Thus, UM has initiated University of Malaya Transformation Research to formulate sustainable solutions for the betterment of Bario people while preserving their indigenous way of life and its environment. This is a one year program consisting of six research from the field of engineering, environmental, science, dental health and ageing to identify their real needs and the data will be essential as a basis of decision for future research in Bario.

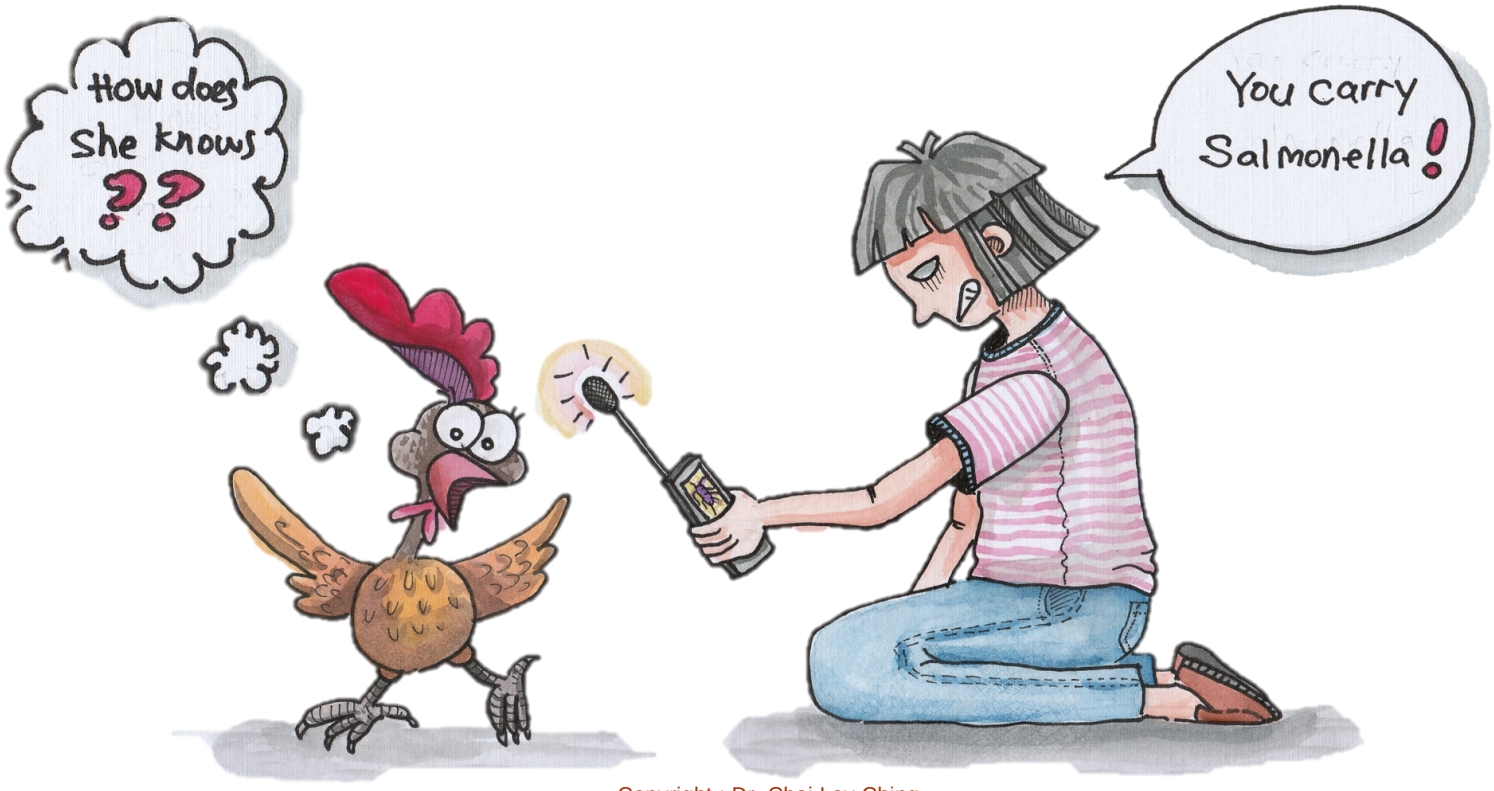
Thus, Dr. Welyne Jeffrey Jehom and her team will study the activities that sustain the elderly health and being physically active, aspect of interpersonal closeness that leads to pro-social behaviour and the significance of communal living. This proposed research project is aligned with the Sustainable Development Goals 3: Good Health & Wellbeing set under the United Nations Development Programme. An initial interview session assisted by two locals (Mdm. Sinar Rang and Mr. Julian Rang) with elders from Sinar Rang Homestay, Bario Asal Long. Future data compilation includes interview session with the elders living in the longhouses, observation of environment around the longhouses, lifestyles and communication among the population.

Production of Bario salts

Rice paddy field in Bario Highlands

Visit to the premise of Bario Single Mother Association

Interview session conducted at Sinar Rang Homestay, Bario Asal Longhouse

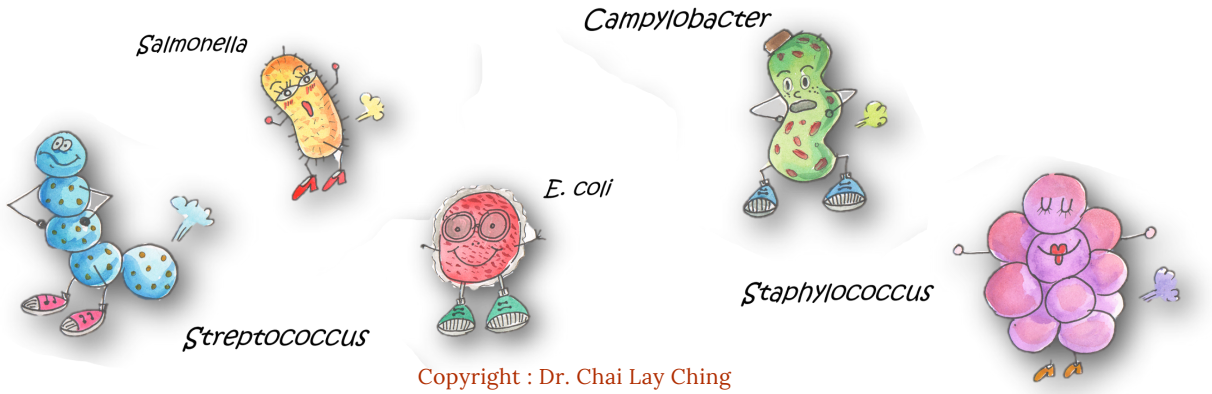


RAPID DETECTION OF FOOD-BORNE PATHOGENS IN FOOD

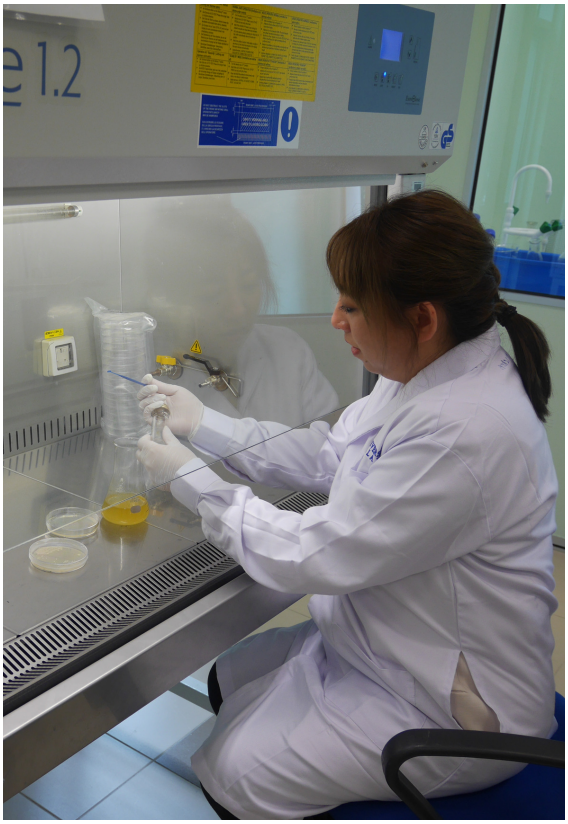
DR. CHAI LAY CHING
FACULTY OF SCIENCE

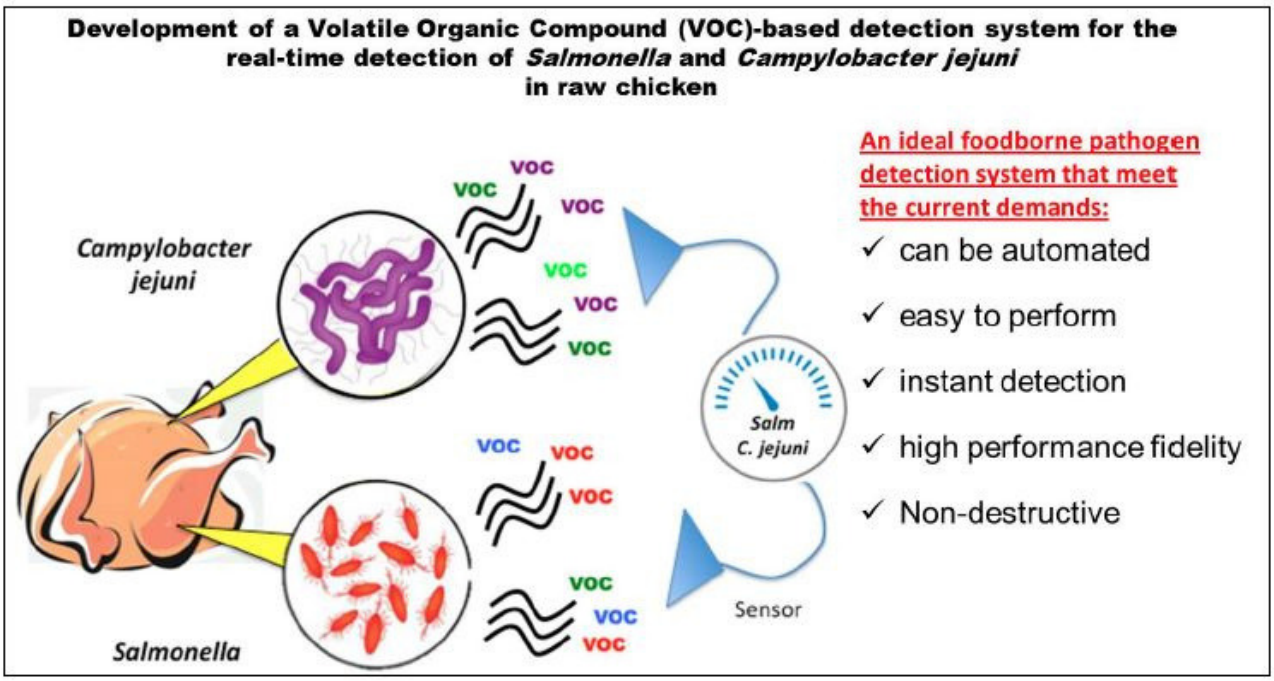
Several studies in Malaysia have shown that nine out of 10 raw chickens in our markets are tested positive for *Salmonella* or *Campylobacter jejuni* contamination. These bacteria are the top causes of food-borne diseases globally, killing more than 150,000 people annually. Unfortunately, the conventional laboratory-based testing approaches of raw chicken are too slow and can no longer meet the demands of today's large-scale food production.

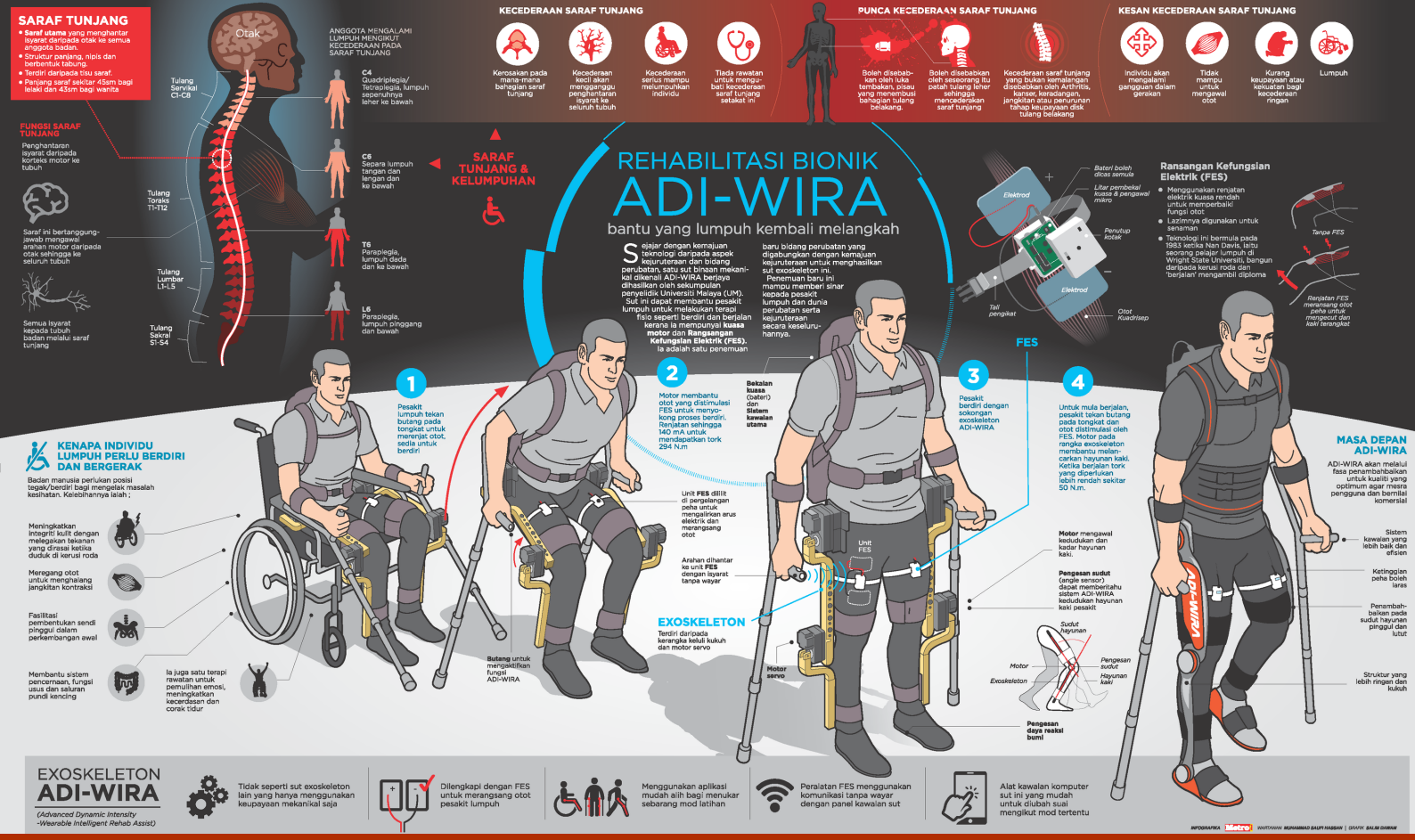
Dr. Chai Lay Ching's work, "Using science to sniff out highly pathogenic bacteria in food", found that *Campylobacter* produces a very specific scent when grow on the agar plate, hence allowing her to correctly identify samples with *Campylobacter* from the negatives ones. This work won her the Malaysia L'Oréal-UNESCO for Women in Science Award 2018.



The proposed solution is based on the detection of specific Volatile Organic Compounds (VOCs) produced by bacteria to identify pathogenic bacteria in food. The findings obtained from this study will generate a database of volatilome of various foodborne bacteria associated *Salmonella* and *C. jejuni*-contamination in raw chicken and different carbon substrates. This work is the key for future development of VOC-based biosensors or electric nose that meet the ideal high-throughput detection criteria. It can also be automated, is easy to perform and instantly detects contamination. The application will not only save lives and reducing morbidities-associated with these bacteria, but will also bring significant economic benefit.







"ADI-WIRA" – THE HUMAN MACHINERY

ASSOC. PROF. DR. NAZIRAH HASNAN, FACULTY OF MEDICINE
&
DR. NUR AZAH BINTI HAMZAID, FACULTY OF ENGINEERING

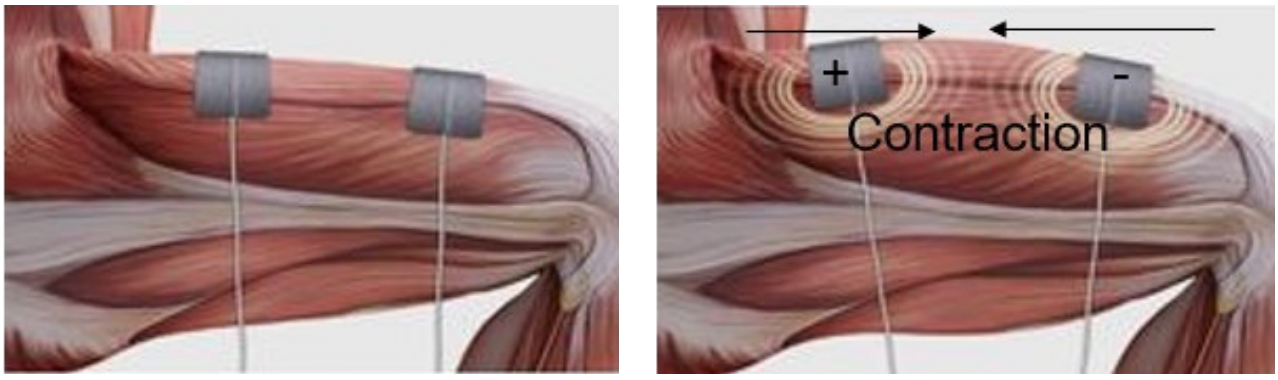
In mammals, the central nervous system (CNS) consist of both brain and spinal cord, the major parts of the whole nervous system. CNS plays an important role in integrating received information while coordinating and influencing the activities in the body. The spinal cord is protected by the vertebra from the base of the skull to the first or second lumbar vertebra. Injuries to the spinal cord will disrupt human movement and present risks of walking or moving disability, as well as lifetime paralysis. Although there is a tremendous advancement in medical technology, a specific treatment to treat spinal cord injuries has yet to be found. Patients with spinal cord injuries could not find any treatment to improve their conditions and their disability will last for the rest of their lives. Individuals diagnosed with paralysis also face with the inability to function, as well as health and psychology issues due to their inability to move or exercise like before.

To address this problem, a group of researchers from University of Malaya (UM) led by Assoc. Prof. Dr. Nazirah Hasnan and Dr. Nur Azah Hamzaid of Faculty of Medicine, in collaboration with Dr. Raja Ariffin Raja Ghazilla and Dr. Norhafizan Ahmad of Faculty of Engineering, build a mechanical structure to assist paralysed patients to stand or walk.

According to Assoc. Prof. Dr. Nazirah Hasnan, a medical rehabilitation specialist, paralysed patients will experience muscle atrophy due to inactivity for a long period of time. Patients with paralysis are unable lying down or sitting for prolong period as such inactivity will cause pressure sores, obesity, heart diseases and fitness issues. Patients are advised to perform exercises such as standing for a period to stimulate their muscles. However, many patients are unable to perform these exercises thus a technology-based solution is needed to assist them in stimulating their muscles.

Assoc. Prof. Dr. Nazirah Hasnan and her team envisioned an exoskeleton mechanical suit to assist patients to move, exercise and stimulate their muscles. The two-year research, which was only joined by Prof. Dr. Glen M. Davies, a researcher in medical physiology from University of Sydney, Australia gave birth to an exoskeleton mechanical suit known as Advanced Dynamic Intensity – Wearable Intelligent Rehab Assist (ADI-WIRA). Currently, ADI-WIRA is unable to let paralysed patients walk again without aid from wheelchair, hence it is utilised as a rehabilitation tool for these patients.

The exoskeleton of ADI-WIRA is made of solid and lightweight materials and have shown satisfying results after several trials with the patients. ADI-WIRA is equipped with special motor, battery pack and Functional Electrical Stimulation (FES). The researchers have upgraded the FES, which is to be placed at the patient's muscle where electricity will flow in to contract and relax the muscle, thus creating a cycle of movement. FES is programmed to follow the cycle of normal human movement and each data will be loaded into a special software to assist the patients to walk. ADI-WIRA will undergo additional trials to be more patient-friendly, of better quality and higher commercial values. It is estimated that the final product will be ready by the end of 2019.



Functional Electrical Stimulation (FES) excites motor nerve of the muscle to contract

MUSHROOM POISONING

DR. PHAN CHIA WEI
FACULTY OF MEDICINE

Chlorophyllum molybdites (poisonous)

Malaysians are generally obsessed with "cendawan busut", or scientifically known as *Termitomyces* mushroom. Wild and edible, it also grows as a symbiont in the termite nests. Eating mushrooms can be good for health as they contain unique polysaccharides that exhibit immune-modulating effects. Most importantly, mushrooms are rich in selenium, which most green plants do not have.

The *Termitomyces* mushroom is so delicious that mushroom enthusiasts pick them whenever they go for mushroom foraging. However, foraging on your own can be dangerous and fatal. The problem arises when another mushroom, *Chlorophyllum molybdites*, is confused with *Cendawan Busut.* This *Chlorophyllum* mushroom is the culprit behind the repeated cases of mushroom poisoning lately.

Chlorophyllum molybdites is the poisonous mushroom that is most frequently reported in Malaysia. The mushrooms are commonly found on lawns and open grass area. When eaten, the symptoms are predominantly gastrointestinal, with vomiting, diarrhea, and dehydration. The poisoning symptoms occur one to three hours after consumption and can be severe, but none has yet resulted in death.

Observing at the difficulties faced by clinicians to provide timely and proper treatment to patients suffering from mushroom poisoning, a group of researchers from Mushroom Research Centre, University of Malaya (UM) has worked together with the Emergency Department of Hospital Kuala Lumpur (HKL) to provide training for the doctors. The project is funded by UMCares with the aims to transfer knowledge from mycologist and scientist to hospital, and make mushroom poisoning a differential diagnosis in acute gastroenteritis.

The project, led by Dr. Phan Chia Wei from the Department of Pharmacy and Mushroom Research Centre, has been awarded The Best Community Service Award under the Medical Cluster category by UM.

More than 100 emergency doctors and medical officers registered for the workshop. The participants are exposed to basic knowledge on mycology, i.e. the study of fungus, clinical management of mushroom poisoning, mushroom toxicology surveillance system and so forth. A National Mushroom Poisoning Network has been initiated between UM, HKL and the Ministry of Health (MOH) and it will draft and launch the first Malaysian mushroom poisoning guideline in the near future.

Cendawan Busut (edible and non-poisonous)

Public health officer picking up possible poisonous mushrooms after report of incidence occurred

Researchers from Mushroom Research Centre (Prof. Dr. Vikineswary Sabaratnam, Dr. Tan Yee Shin, and Dr. Phan Chia Wei) and Dato Dr. Alzamani (front left), medical expert and consultant from HKL

MOSQUE TOURISM IN MALAYSIA

PROF. DR. AININ SULAIMAN

UNIVERSITY OF MALAYA HALAL RESEARCH CENTRE (UMHRC)

Mosque or 'Masjid' in Arabic and Malay is primarily the holy house for Muslims, where they gather to prostrate themselves before Allah in unity, devotion and total submission. A mosque plays an important role in the Muslim society – more than just a place of worship, it also acts as a community centre where people come to seek knowledge, uphold justice and even tie the knot. Each mosque contains a *mihrab*, which marks the direction of the Kaaba in Mecca, and a *mimbar*, from where sermons are delivered. A mosque's most distinguished features are perhaps its tall minaret and dome, which are instantly recognisable from afar. Its interior is normally decorated with intricate Arabic calligraphies comprising verses and phrases from the Holy Qur'an. These days, mosques are as much a tourist attraction as they are a place of congregation for Muslims with their awe-inspiring architectures and impressive designs, which mostly combine both traditional and modern elements. A mosque maybe considered a tourist attraction if they are unique and outstanding. Malaysia has many old and new beautiful mosques, built in every corner of the country. A team of UM researchers, led by Prof. Dr. Ainin Sulaiman, was commissioned by the Islamic Tourism Center to conduct a study on the Profiling of Mosques with Tourism-Related Attractions within the Tourism Corridors in Malaysia.

The objectives of the study were as follows:

- To trace the historical background and describe the architectural design of mosques.
- To categorise the facilities and activities provided by the mosques in Malaysia.
- To collect information on the mosques with tourist attractions in Malaysia for development of a standardised visitor guide/storytelling text for use in mosque tour.
- To identify mosques in Malaysia that has the potential to be promoted as tourist attractions.
- To develop and recommend strategies to attract more local and foreign tourists to visit the mosques.

The team adopted a mixed method approach (both qualitative and quantitative) to collect primary data. Interviews were conducted with the Imams and committee members of selected mosques, various state religious departments, tour operators and guides, ABIM Outreach and other stakeholders. A survey was administered to selected mosques to measure their readiness to embrace Mosque Tourism. In addition a survey was also administered to 1200 tourists to obtain tourists' perception towards Mosque Tourism.

The study found that there are 40 mosques that are ready to be promoted as Mosque Tourism and a number of mosques, namely Masjid Wilayah Persekutuan, Masjid Negara, Masjid Putra, Masjid Tuanku Mizan Zainal Abidin, Masjid Sultan Salahuddin Abdul Aziz Shah, and Masjid Jamek Sultan Abdul Samad, are already embracing Mosque Tourism as they have been receiving tourists. It was also found that many of the tourists surveyed visited the mosques to take photos and to observe the Islamic culture.

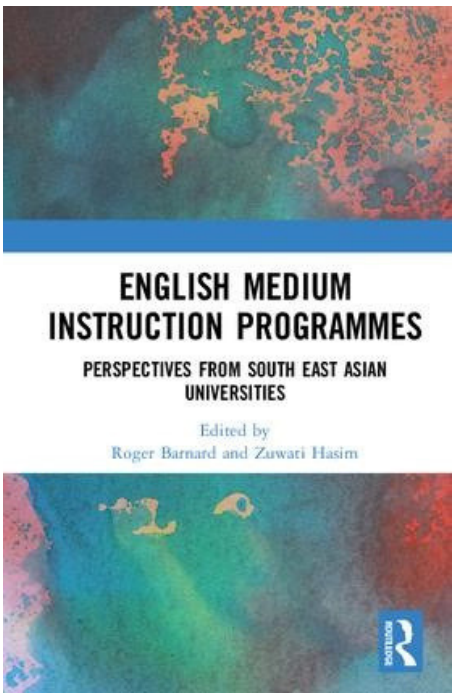
Acknowledgement

The researchers would like to thank the Islamic Tourism Center Malaysia for funding the study.

Co-Researchers

Assoc. Prof. Dr. Noor Ismawati Jaafar
Assoc. Prof. Dr. Mohd Zulkhairi Mustapha
Assoc. Prof. Dr. Shamshul Bahri Zakaria
Dr. Azni Zarina Taha
Dr. Mozard Mokhtar
Dr. Mohd Edil Abd Sukor
Dr. Sedigheh Moghavenni
Dr. Siti Rohani Yahaya

FEASIBILITY OF USING ENGLISH LANGUAGE AS A MEDIUM OF INSTRUCTION



DR. ZUWATI HASIM
FACULTY OF EDUCATION

There is an increasing trend in many universities in Asia, as elsewhere in the world, to introduce 'international' academic programmes taught through the medium of English. Despite the rapidity of this development, the issue of language of instruction has long been debated and there is a dearth of empirical research that investigates the opportunities and challenges across a range of specific contexts.

The project started in 2016 that took lead from Ali's (2013) study on 'A changing paradigm in language learning: English medium instruction policy at tertiary level in Malaysia'. It intends to occupy this research space, firstly by reviewing historical and contemporary trends and changes to English Medium Instruction (EMI), and by exploring the desirability and feasibility of EMI in specific university settings in South East Asia; as well as to explore Malaysia, Brunei and Indonesia lecturers' beliefs and practices pertaining to EMI through research collaborations.

Based on these empirical studies, findings were presented and first published by Routledge in 2018. The project had also successfully gathered other academics and researchers - from Japan, Australia, New Zealand, Hong Kong, Singapore, and Denmark – as research collaborators and consequently contributed to the production of this EMI edited book as part of the research output. Part of the findings comparing the three case studies was also published in the Classroom Research Column of the Modern English Teacher (www.modernenglishteacher.com) magazine, United Kingdom. The research output will provide guidance for decision-makers and practitioners for the effective planning and implementation of EMI programmes where English is an additional language for lecturers and students and its implications will be drawn with regard to policy, curricula, pedagogical practice, professional development and further research.

MALAYSIANS' INTERPRETATION OF UNITY

ASSOC. PROF. DR. ROSILAWATI ZAINOL
CENTRE FOR CIVILISATIONAL DIALOGUE

Unity in a society will always lead to peace in a nation. It is important in sustaining human civilisation. In Islam, it is a direct command of Allah. "And hold fast, all together, by the rope which Allah (stretches out for you), and be not divided among yourselves." (Al-Qur'an, 3:103).

In a multicultural society in Malaysia, unity is the basis of peace. An analogy that best describes the multicultural society in Malaysia is a salad mixed in a bowl that requires a binding agent, such as the salad dressing to bond the different culture. What would the best binding agent be?

Knowledge, understanding and respect of other cultures must be instilled at a young age. Knowledge and understanding of other cultures will lead to mutual respects among individuals (UNESCO, 1998). Knowledge is important in sustaining any civilisation. Lack of knowledge in any discipline will lead a civilization to its end (Arbab, 1998). History has shown the importance of knowledge in science and religion to any civilization.

In another perspective, diverse cultures can uplift economic performance. Ashraf and Galor (2013) highlight "the interplay between cultural assimilation and cultural diffusion have played a significant role in giving rise to differential patterns of economic development across the globe."

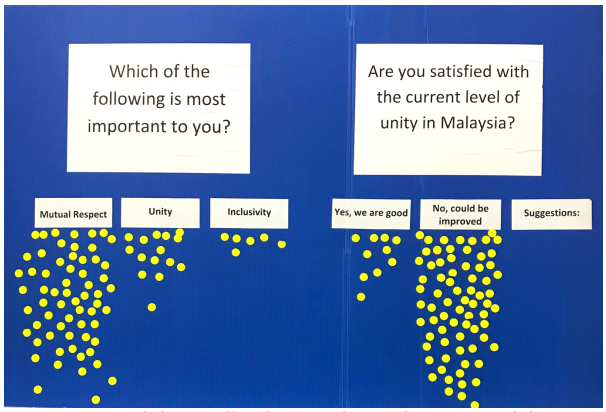
Data for this study were collected from the Piece of Peace activity, organised during the Walk for Unity 2.0 event by the Centre for Civilisational Dialogue with its co-organisers on 12 May 2018, two days after the historic 14th General Election. The objectives of this event are to promote intercultural communication and to strengthen the bonds between young Malaysians while enjoying the beautiful scenery in the University of Malaya.

Two main routes were designed. The first one is 3 km and the second one is 5 km route distance. All participants were encouraged to bring their montage to represent unity and peace and to participate in three mini activities along the routes. The mini activities that were organized are Jegi Chagi, Your Peace, Your Choice, Piece of Peace, and the Post Peace. About 200 participants took part in the event with a various cultural and religious background.

Activities conducted at the Walk for Unity event

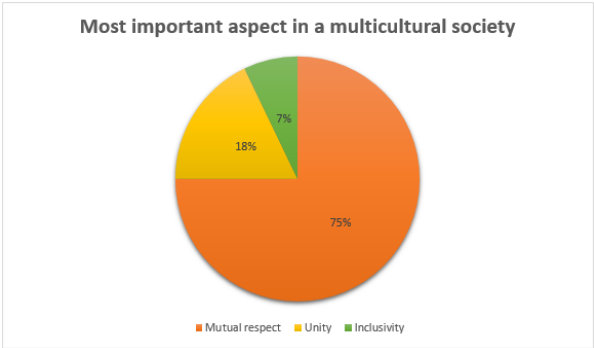
Activities conducted at the Walk for Unity event

At the the Piece of Peace activity respondents were asked about three important concepts in living in the multicultural society and their satisfaction on the level of unity in Malaysia. Respondents believe that mutual respect is the most important compared to unity and inclusivity in Malaysia society. Majority of them chose mutual respect, and this could serve as the binding agent that the study intended to find out.

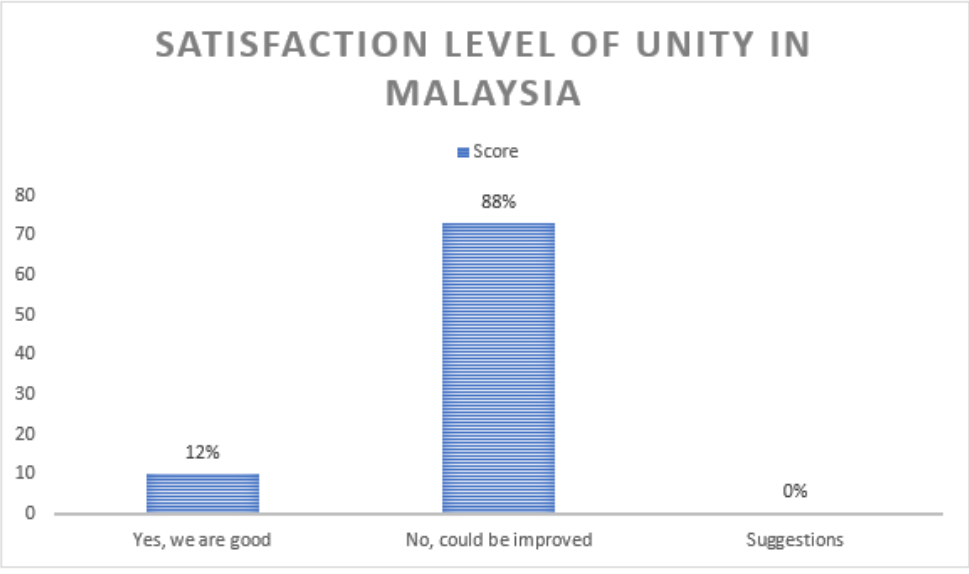


Output of data collection at Piece of Peace activity

The second part of the Piece of Peace deals with respondents' satisfaction level of unity in Malaysia. Findings show a majority of them are not satisfied with the current level of unity in Malaysia. However, no suggestions were recorded during the walk.



Views on the most important aspect in a multicultural society



Satisfaction level of unity in Malaysia

A lot more programmes must be done to achieve a solid unity among Malaysians. Unity doesn't exist on its own but rather must be achieved. Parents, educators, communities, government and policy makers must work together. As highlighted in Goal 17 in the Sustainable Development Goals, collaboration and multi-stakeholder partnerships are crucial in achieving unity in a nation. Everyone has to work together to ensure unity globally.

As mentioned in the first part of this article, a binding agent is required to provide a common ground in uniting a nation. For Malaysians, food varieties can be one of the binding agents to promote unity in a diverse culture. Mamak's delicacies are attractive to many Malaysians. Figure 5 shows a scene in a mamak's restaurant. Malaysians from all walks of life and age with diverse background eat at mamak restaurants and this scenario is common in Malaysia.

Scenes at one the mamak's restaurants

Thus, knowledge and common binding agents can be used to ensure unity in a nation. Staying united will sustain any civilisation. Therefore, education plays a role in promoting unity among the multicultural society. Given the salad bowl analogy, there is no other way for the multicultural society to be blended but through knowledge and education. The findings of the study show the level of unity in Malaysia is not up to the desired level. A binding agent is required to bind the diverse cultures in the Malaysia society. This can be derived by having mutual respect of the various races which can be attained through education. This study has highlighted the importance of knowledge and education in embedding values that can promote mutual respect among the diverse background of Malaysian society. Education policy must be revamped to include this crucial element in bonding the current diverse society as it must be carried out at a very young age. Mutual respect will promote unity among multicultural Malaysian society and will then promote economic growth as highlighted by Spolaore and Wacziarg (2013). Malaysia will excel in its nation building if its diverse cultures are understood and embedded smoothly in its society (McLeod, Lobel, & Cox, 1996).

Acknowledgement

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PERINTIS 2018 GOLD

PERTANDINGAN REKACIPTA DAN INOVASI IPTS

UMR University of Malaya Research

UNIVERSITY OF MALAYA

SCOLTECH - NEW TECHNOLOGY FOR SCOLIOSIS DIAGNOSIS AND PROGRESSION MONITORING

The severity of scoliosis is determined on two parameters, magnitude of spinal curvature and angle of trunk rotation (ATR). Spinal curvature is measured by radiography X-ray imaging, while ATR is measured using conventional baseline-scoliometer. Existing methods has low efficiency and require qualitative analysis. People who live in rural areas has limited access to healthcare facilities like X-ray. Hence, many patients are unaware of spinal deformities issues and the consequences caused by spine-related problems. Therefore, this invention may be able to improve the access and overall scoliosis diagnosis.

PATENT APPLICATION NO.: PI 2017703051
FILING DATE: 18/08/2017

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PERINTIS 2018 GOLD

PERTANDINGAN REKACIPTA DAN INOVASI IPTS

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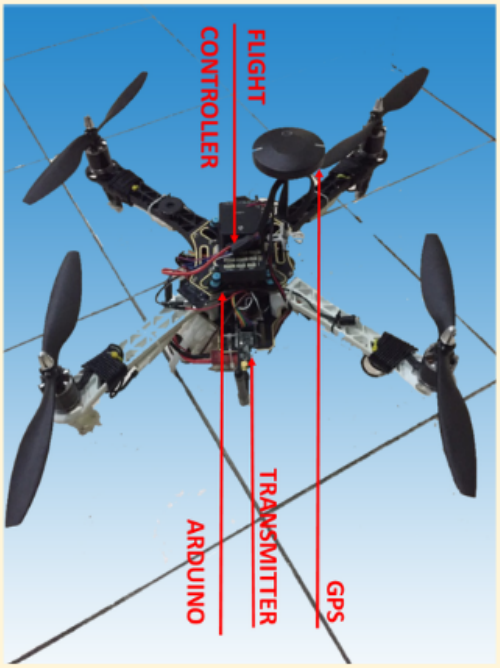

AUTONOMOUS QUAD-COPTER PRECISION LANDING ON A MOVING PLATFORM

An Unmanned Aerial Vehicles (UAV) - quad-copter is an unmanned flying vehicle. The quad-copter could identify distance and yaw angle between two points from the received coordinates and land on a moving platform without any assistance from the pilot via a GPS receiver. The UAV can be applied in military field & ocean surveillance.

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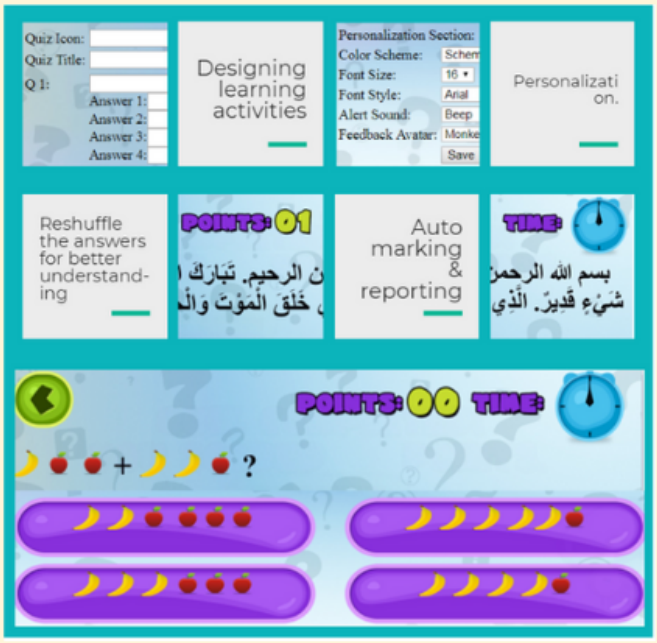

AUTISM CONTENT MANAGEMENT LEARNING SYSTEM (ACMLS)

ACMLS facilitates special education teachers in designing learning activities for students, reporting on learning progress and personalising user interfaces. Parents can monitor the progress of the children's learning via ACMLS, allowing them to continue the learning activities and exercises at home. ACMLS framework consists of four stages: i) intervention evaluation; ii) usability heuristics evaluation; iii) experts' feedback; and iv) Neurosky Mindset feedback in order to access the quality of ACMLS.

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LABORATORY ANIMAL CENTRE

- SUPPLY LABORATORY ANIMALS SUCH AS SD RAT, ICR MICE AND BALB/C MICE
- PROVIDES DAILY MAINTENANCE SERVICES FOR QUARANTINE AND EXPERIMENTAL ANIMAL

CONTACT US:

Laboratory Animal Centre,
Centre of Research Services,
Institute of Research Management & Services (IPPP)

Mdm. Noor Zarina Nayan
03-79674514
noorzarina@um.edu.my

Animal Testing facilities

UNIVERSITY OF MALAYA

IPPP CENTRAL LAB FACILITIES & SERVICES

LC/MS Q-TOF

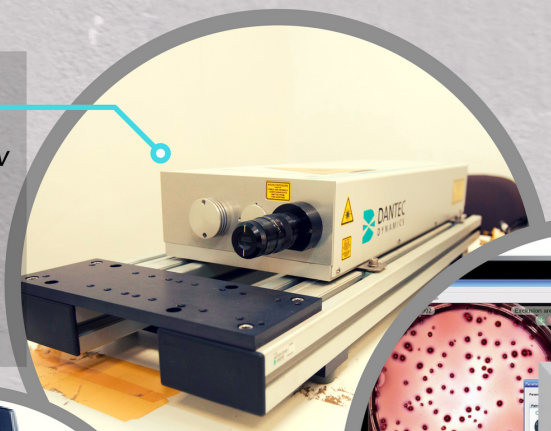
AGILENT 6550 iFUNNEL

- Separate wide range of organic compunds from small molecules, drugs, metabolites, peptides & protein.
- Optimized for qualitative analysis and provide information on high resolution molecular weight.

PARTICLE IMAGE VELOCIMETRY

DANTEC DYNAMICS NANO L135-15PIV

- Whole-flow-field technique providing instantaneous velocity vector measurements in a cross-section of a flow.
- Applications for fluid & solid mechanics, hydraulics, hydrodynamic, material research.



AUTOMATED SPIRAL PLATER & COLONY COUNTER

EASY SPIRAL INTERSCIENCE & SCAN 500

- Automatic plating on petri dish in seconds with decreasing concentration.

RHEOMETER

TA INSTRUMENT DHR-2

- Provide information of the material viscosity and viscoelastic.

REAL TIME PCR

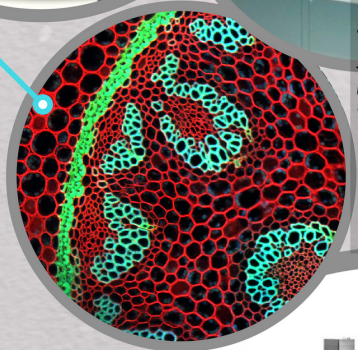
QUANTSTUDIO 12k FLEX

- Absolute quantitation
- Gene expression analysis
- miRNA
- ncRNA
- Protein expression analysis
- SNP genotyping
- Copy number variation
- HRM analysis

CONFOCAL LASER SCANNING MICROSCOPE

LEICA TCS SP5 II

- 3D images by optical sectioning
- Live cell imaging



SURFACE AREA ANALYZER

Micromeritics ASAP2020
TRISTAR II 3020 Kr

- Surface area (BET/LANGMUIR)
- Pore volume & size distribution
- MS ISO/IEC 17025 TESTING SAMM NO. 837

FIELD EMISSION SCANNING ELECTRON MICROSCOPE

FEI QUANTA FEG 450
OXFORD

- Structure (topography & morphology) and composition characterization

ELLIPSOMETER

J.A. WOOLLAM M-2000V

- Measure polarization state of light reflected from a surface of material.
- Widely used in thin film identification, film thickness, optical constant.

AGAR PLATING SERVICE

- Nutrient agar, tryptic soy agar and many more.

PULSED FIELD GEL ELECTROPHORESIS

BIO-RAD CHEF MAPPER

- Separate large DNA molecules by applying to a gel matrix an electric field that periodically changes direction.
- Applciation: contamination source tracking, provide information of bacteria based on their retention time.

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REFRIGERATEED CENTRIFUGE(KUBOTA 3500)

MIX OR BLEND BY ROTATION AROUND A FIXED AXIS AND APPLYING A FORCE PERPENDICULAR SPIN

SIMULTANEOUS THERMAL ANALYZER (STA)

REAL-TIME MEASUREMENT AND ANALYSIS OF SAMPLE WEIGHT (TGA SIGNAL) AND HEAT FLOW (DTA/DSC SIGNAL) CHANGES

NANODROP SPECTROPHOTOMETER

(IMPLEN P -300)
MEASURING DNA CONCENTRATION IN MICROLITER VOLUME

MICROPLATE READER(VERSAMAX)

FLEXIBILITY OF MONOCHROMATOR BASE SYSTEM THAT MEASURE WAVELENGHT RANGE 340 NM – 850NM IN 96 WELL-PLATES

THERMOCYCLER (PEQSTAR96X)

DNA SEQUENCING, CLONING, GENERATION OF PROBE, QUANTIFICATION OF DNA AND

REAL TIME PCR (ViiA7)

MONITOR THE AMPLIFICATION OF TARGETED DNA MOLECULE DURING POLYMERASE CHAIN REACTION

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